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(54) Adjustable Flooring

(57) Adjustable flooring comprises a floorboard (1) provided on its undersurface with a pair of parallel joists (2) carrying a plurality of evenly-spaced nuts (5) which cooperate with adjusting screws (6) accessible through holes (4) in the floorboard (1).

When the floorboard (1) is laid on a concrete surface, the height and inclination of the floorboard relative to the surface can be adjusted by selective adjustment of the screws (6) to provide an even floor. Individual floorboards (1) can be lifted to provide subsequent access to service lines beneath the floor.

FIG. 1

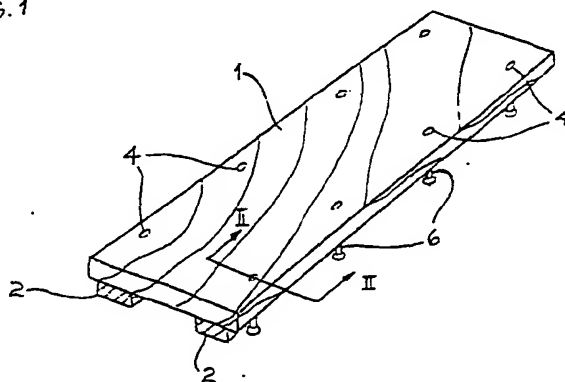
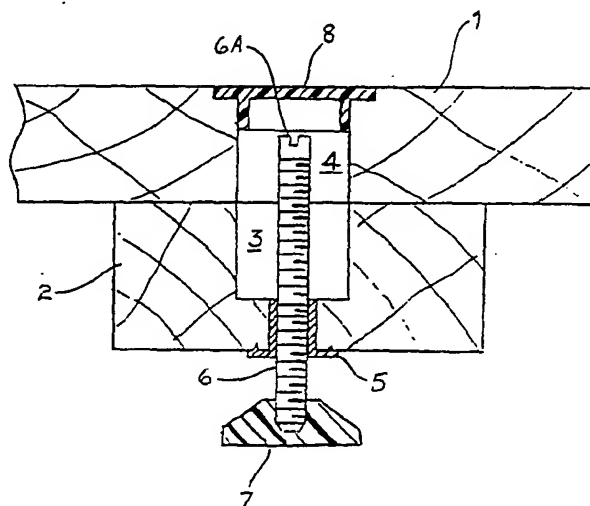


FIG. 2



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FIG. 1

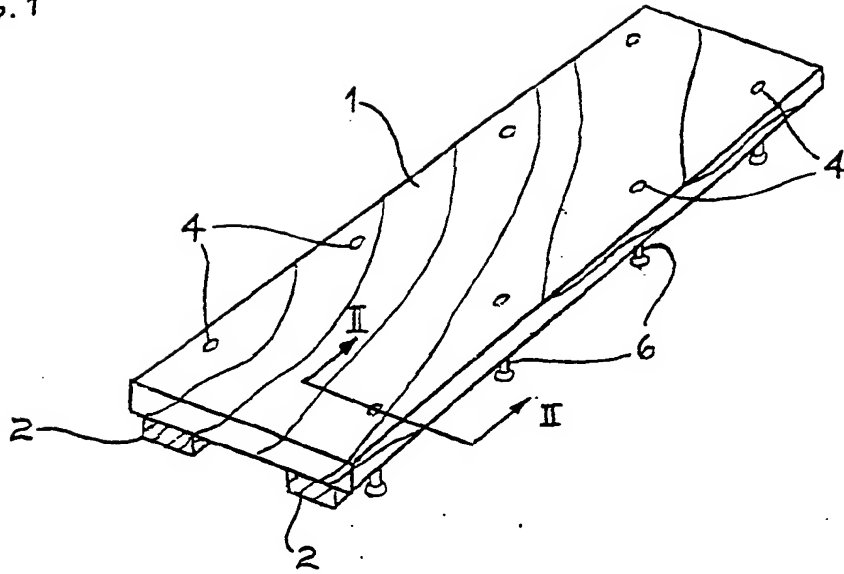


FIG. 2

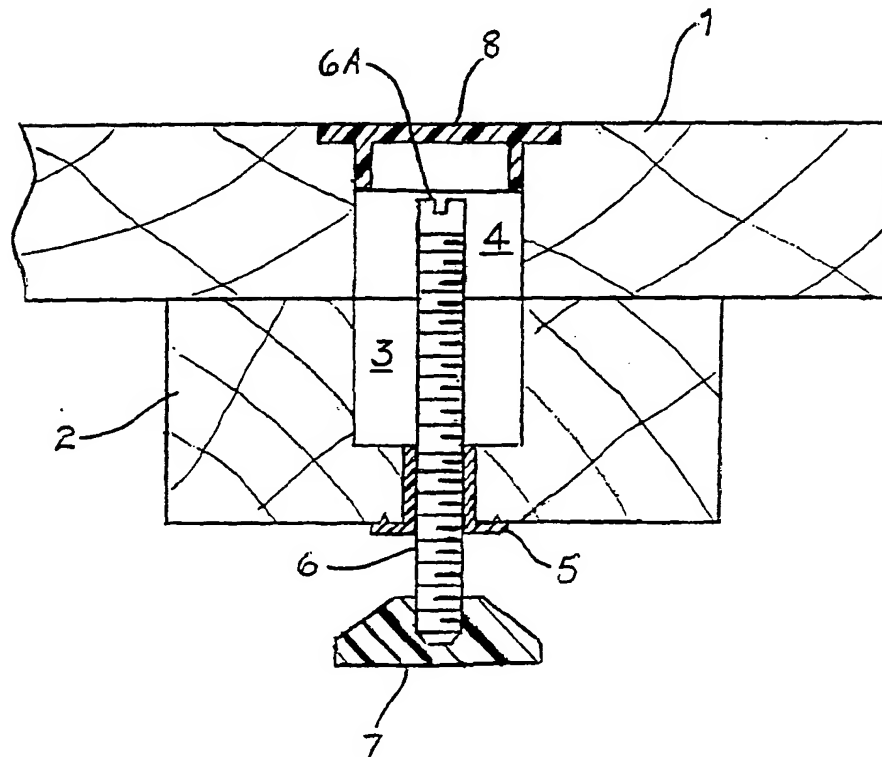
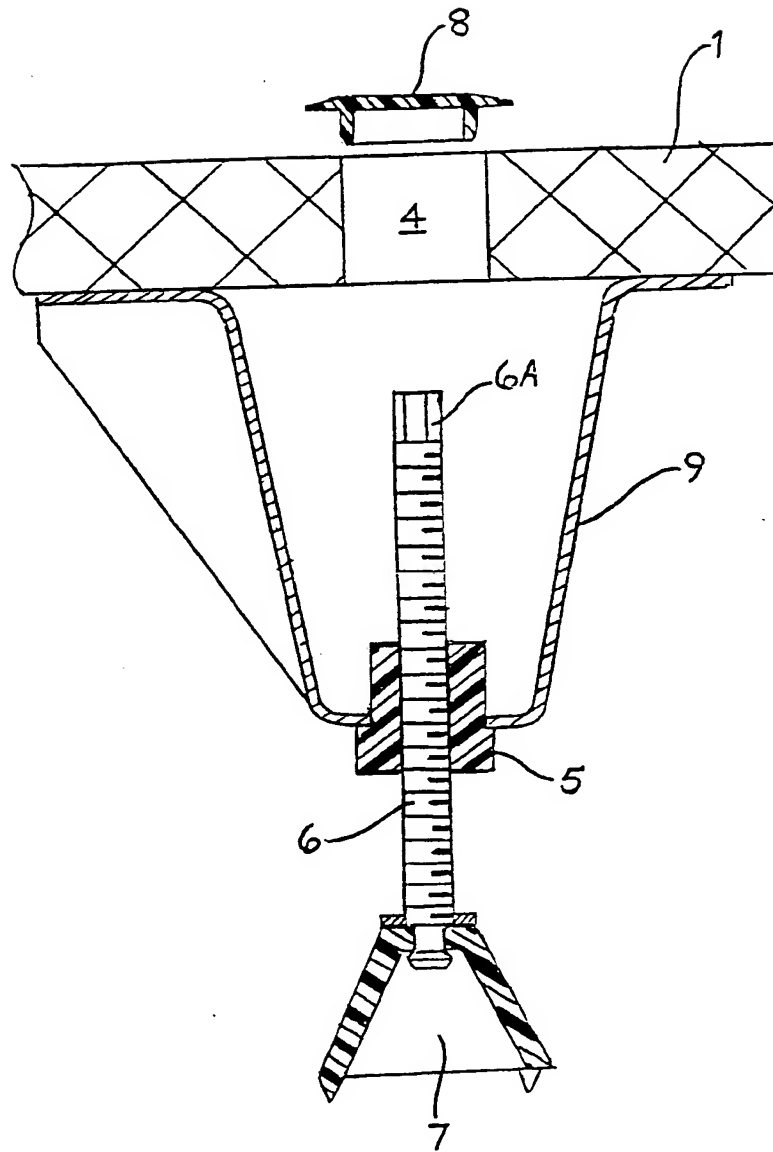


FIG. 3



SPECIFICATION Adjustable Flooring System

The present invention relates to an adjustable flooring system which is suitable particularly, but not exclusively, for laying on an uneven supporting surface such as an oversite concrete foundation or rough cement screed.

The laying of a level floor on a rough concrete surface is traditionally a job for skilled labour, particularly when such a floor is laid over service lines, such as electricity cables and water or gas pipes, and must allow subsequent maintenance access to the services. In conventional methods, the service lines may be laid either in ducting around which the concrete or cement screed of the floor is poured, or in an interspace between the foundation surface and an elevated floor which is laid in a traditional manner with floorboards supported on transverse joists.

The object of the present invention is to provide a system of flooring which can be laid on an uneven surface by unskilled labour, and which provides easy access to an underfloor space for the maintenance of service lines or the introduction of underfloor insulation.

According to a first aspect, the present invention provides an adjustable flooring member provided on its undersurface with mechanically-adjustable support means which permit positional adjustment of the flooring member relative to a supporting surface, the support means being accessible for adjustment from the upper surface of the flooring member.

The flooring member may be of any suitable material and, although it is envisaged that traditional floorboards or chipboard panels will be used most commonly, it will be appreciated that more specialised materials, such as metal sheeting, fire-resistant panels or thermally-insulating composites, may also be used.

The mechanically-adjustable support means may comprise a system of cams or linkages but in preferred embodiments the support means are screw-adjustable. In some examples, the flooring member may be provided with two pairs of pivoted legs which are interconnected by a screw-shackle accessible through an opening in the flooring member to pivot the pairs of legs towards or away from each other, thereby adjusting the height of the flooring member relative to the supporting surface. In other examples, the flooring member may be provided with lead-screws which are accessible through holes in the member to displace respective travelling nuts attached to support feet, thereby permitting the adjustment of both the height and inclination of the flooring member.

In preferred embodiments, the support means comprise adjusting screws which are accessible for adjustment through holes in the flooring member to rotate in cooperating nuts mounted beneath the flooring member in register with the access holes, and thereby adjust the height and

inclination of the flooring member relative to the supporting surface. Clearly, the number, gauge and disposition of the adjusting screws will depend on the dimensions and anticipated loading of a particular flooring member. In the case of a rectangular floorboard or chipboard panel the screws may be spaced evenly along each longitudinal edge, while equal-sided flooring members, for example, with a square, triangular or hexagonal shape, may have an adjusting screw at each corner and, perhaps, at its centre.

Although the nuts may be fixed at the lower ends of the access holes and a range of different length screws provided, it is preferable that the nuts are spaced from the undersurface of the flooring member, so as to increase the range of adjustment by permitting the use of a relatively long screw which can be accommodated between the nut and the upper surface of the flooring member without projecting above the latter if the screw is fully retracted in use. This spacing may be achieved by mounting each nut on a respective spacing block or bracket which is attached to the flooring member. In preferred embodiments, in which the flooring member comprises a rectangular floorboard, the nuts are carried by a pair of elongate members, such as channel members or joists, which are attached to the undersurface of the floorboard adjacent respective longitudinal edges.

In preferred embodiments, the screws are provided with metal or plastics feet to provide additional purchase on the supporting surface and, in some examples, the feet may be resilient and/or pivotable relative to the axis of the screw by up to 20° in any direction. The upper ends of the access holes are preferably counter-bored to receive removable closure plugs which lie flush with the upper surface of the flooring member when inserted.

According to a second aspect, the present invention provides a method of laying an even floor on an uneven supporting surface, comprising the steps of providing the undersurface of the flooring member with mechanically adjustable support means which are accessible for adjustment from the upper surface of the flooring member, laying the flooring member on the supporting surface, and adjusting the support means selectively to adjust the height and/or inclination of the flooring member relative to the supporting surface.

By following this method, successive flooring members are positioned on a rough surface and levelled at a desired height to provide an even floor. The positioning and levelling can be effected quickly and simply by unskilled labour, and individual flooring members can be lifted for easy access to service lines or for the introduction of insulating material beneath the floor.

The invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a flooring member of an adjustable flooring system

according to one embodiment of the present invention;

Figure 2 is a partial cross-section taken, on an enlarged scale, along the line II—II of Figure 1,

5 and

Figure 3 is a view similar to Figure 2 of a flooring member according to a second embodiment of the invention.

10 In the drawings, the same reference numerals are used to designate the same or corresponding component parts.

Referring now to Figures 1 and 2, there is shown a flooring member which comprises a traditional wooden floorboard 1 having respective
15 mutually-parallel joists 2 fixed to its undersurface adjacent each longitudinal edge. Each joist 2 is provided at regular intervals with counterbored through holes 3 which are aligned in register with a corresponding series of evenly-spaced holes 4
20 in the floorboard 1. The lower end of each hole 3 in the joists 2 accommodates a respective captive nut 5, in this example, a flanged drive-in nut, which cooperates with a respective adjusting screw 6. Each screw 6 is accessible for
25 adjustment through the corresponding hole 4 in the floorboard 1 and has a nylon foot 7 fixed rigidly at its lower end for engagement with a rough supporting surface. The head 6A of each screw 6 may have a slot (as shown) for a
30 screwdriver and/or may be hexagonal to receive a socket spanner. The holes 4 in the floorboard 1 are counterbored to receive respective removable plugs 8 which, when inserted, lie flush with the upper surface of the floorboard 1.

35 Figure 3 shows an alternative arrangement using a chipboard floorboard 1 which is provided on its undersurface with sheet metal channel members 9 instead of the joists 2 of the embodiment described above. The bottom of
40 each channel member 9 has a series of evenly-spaced pre-punched holes which accommodate respective expanding nuts 5 aligned in register with a corresponding series of holes 4 in the floorboard 1. Each nut 5 is pushed easily into its
45 respective hole but expands to achieve a tight fit when the cooperating adjusting screw 6 is inserted. In this example, each screw 6 has an hexagonal head 6A and is provided with a clip-on foot 7 which can swivel relative to the screw to
50 provide maximum purchase on the supporting surface.

When the floorboard 1 is being laid as part of a floor on an uneven concrete surface, the
55 floorboard 1 is cut to length and the joists 2 or channel members 9, which are supplied in standard lengths and trimmed as necessary, are fixed to the undersurface of the floorboard 1, the holes 4 are then drilled perpendicularly through the floorboard 1 in correspondence with the pre-
60 formed holes containing the nuts 5, and the screws 6 are started through the holes 4 so as to project sufficiently for the feet 7 to be fitted.

Once assembled, the floorboard 1 is rested, feet 7 downwards, on the concrete surface and

65 the screws 6 are adjusted through the holes 4, to adjust the position of the floorboard 1 relative to the concrete surface, until the floorboard is level. Small irregularities of the surface are

70 accommodated by deformation or movement of the feet 7, particularly in the example shown in Figure 3, while larger variations are accommodated by the selective adjustment of the screws 6 which permits both the height and the inclination of the floorboard 1 to be varied.

75 Neighbouring floorboards 1 are then laid in the same way to produce an even floor and, after any final adjustments have been made, the plugs 8 are inserted to close the holes 4 in the floorboards. The plugs 8 may be removed easily
80 should subsequent adjustment of the floor level be necessary.

Should additional support be required, for example, at an awkward corner or in an area of anticipated high loading, a joist 2 or channel
85 member 9 may be cut into short sections, containing only one or two screws 6, and fixed beneath the floorboard in the above-described manner to provide the extra support.

90 In some examples, the feet themselves may be screw-adjustable on the screws to permit fine adjustment of the level of the floorboard, but in other examples the feet may be integral with the adjusting screws.

Claims

95 1. An adjustable flooring system comprising at least one flooring member provided on its undersurface with mechanically-adjustable support means which permit positional
100 adjustment of the flooring member relative to a supporting surface, the support means being accessible for adjustment from the upper surface of the flooring member.

2. An adjustable flooring system as claimed in Claim 1, in which the support means are screw-
105 adjustable.

3. An adjustable flooring system as claimed in Claim 1 or Claim 2, in which the support means comprise a plurality of adjusting screws which are
110 accessible through holes in the flooring member to rotate in cooperating nuts mounted beneath the flooring member in register with the holes.

4. An adjustable flooring system as claimed in Claim 3, in which the flooring member comprises a rectangular floorboard and the nuts are carried
115 by a pair of elongate members which are attached to the undersurface of the floorboard adjacent respective longitudinal edges thereof.

5. An adjustable flooring system as claimed in Claim 4, in which the elongate members comprise a pair of substantially parallel channel members,
120 the bottom of each channel member being provided with a series of evenly-spaced holes accommodating respective nuts which are spaced from the floorboard holes with which they are
125 aligned.

6. An adjustable flooring system as claimed in Claim 5, in which the nuts are expanding nuts

which achieve a tight-fit in the respective holes when the screws are inserted.

- 5 7. An adjustable flooring system as claimed in Claim 4, in which the elongate members comprise a pair of substantially parallel joists which are provided with evenly-spaced through holes, the nuts being inserted at the lower ends of the screw holes and being spaced from the floorboard holes with which they are aligned.

- 10 8. An adjustable flooring system as claimed in any of Claims 3 to 7 inclusive, in which the lower ends of the adjusting screws are provided with feet for engagement with the supporting surface.

- 15 9. A method of laying an even floor on an uneven supporting surface, comprising the steps of providing the undersurface of a flooring member with mechanically-adjustable support means which are accessible for adjustment from the upper surface of the flooring member, laying the flooring member on the supporting surface, and adjusting the support means selectively to adjust the height and/or inclination of the flooring member relative to the supporting surface.

- 20 10. An adjustable flooring system substantially as herein described with reference to, and as shown in, the accompanying drawings.